Frankly Speaking

Don't By-pass!

THE war has made many changes in the habits of the American people, but there is one matter in Traffic and Transportation that has been subject to no alteration. This is the basic fact that we need adequate terminal facilities for all modes of transportation. To Traffic Engineers this problem has appeared most frequently in the past in the form of curb parking—a cause of high mortality in the profession. More recently it has been cast in its proper proportion as a matter of terminals whether they be on or off the street.

So far this problem has not been solved. Investigation discloses that many new war plants have been built and others converted to war use without proper consideration for the terminals at the plant. This has been most serious at the new plants because many have been built beyond the limits of established mass transportation forcing the majority of workers to commute by private vehicle. In some cases inadequate roadways have been blamed for traffic delays when the trouble was caused by shortage of terminal capacity and lack of coordination of the terminals of various modes of transportation.

Today is not the time to make any but the most needed changes in this program but there is a time coming when much can be done. Thought on this matter is justified now. This is recognized in a bill pending before the House of Representatives at the present time. It provides for three billion dollars in Federal aid for street and highway construction for the first three post-war years. The significant fact is that this bill includes the development of off-street parking facilities and for facilities to give access to and between transportation terminals—as authorized expenditures.

The adoption of this type of legislation is certainly a step in the right direction. While we are building new arteries in the post-war construction program let's clear the existing arteries of stored vehicles by providing off-street terminals. With the increase in air travel, let's provide proper facilities for the meeting of land and air. And finally, it should be kept uppermost in our thinking that no form of transportation is of any value if we can only ride. We must have terminals at each end of the trip.

T. J. Sebum

Member, Board of Direction

VOLUME XIII JUNE, 1943 NUMBER 9

TRAFFIC CONTROL AND PARKING PLANS FOR INDUSTRIAL PLANTS

by DWIGHT M. McCRACKEN

BEFORE Pearl Harbor the average number of automobiles per 100 employees varied between 50 and 75. In many cases it was even higher than 75. The natural result was a heavy concentration of cars on or near industrial plants. Furthermore, the fact that the occupants of these cars all had to be at the same place at the same time resulted in long lines of vehicles overloading the highways and access roads at shift-change times. The advent of rationing has reduced this load somewhat, but there are still tremendous traffic loads on roadway facilities in industrial areas.

Cause and Effect: The problems created by these loads are: delay, confusion and exposure to accident. These result in: lost-time injuries, lowered efficiency from fatigue to employees, and interference with highway shipments of war materials.

In time of war the danger of large-scale industrial fires, explosions, or other catastrophes is increased by saboteurs, the pressure for speed in war production and aerial attack. When such emergencies occur, it is vital, to minimize damage, to reach the stricken plant quickly with rescue vehicles, such as fire apparatus, ambulances and repair crews from public utilities.

Unfortunately, "curiosity seekers" dash to the scene from nearby roads and, if uncontrolled, will completely clog the approaches for rescue vehicles. Recently, the plant protection chief of a midwest ordnance plant explained his forethought in having ready a complete Interceptor Post system by saying, "A few years ago, at another plant, I watched our plant burn while fire apparatus a scant half mile away tried vainly to break through a wall of sight-seers' vehicles."

Plant employees, en route to or from the plant, may unintentionally cause road blocks unless properly directed. In fact, fires or explosions caused by saboteurs or by enemy aircraft may be timed for shift changes when access roads are lined with workers' cars. All traffic was blocked for five hours on a West Coast emergency route when the oncoming and offgoing shifts met near the plant following an air raid alarm.

A large concentration of automobiles in plant parking areas aids enemy airmen in finding vital targets. Even at night, the tops of solidly parked cars reflect skylight much as does a body of water. In many cases vehicles occupy more ground area than the plant buildings. This same concentration of parked cars itself invites bombing and the destruction of hundreds of irreplaceable vehicles.

Long lines of cars going to and from the plant at shift change times direct enemy airmen to the plant site in daylight or darkness. The employees sitting in these cars also afford profitable strafing targets because skilled workers cannot be easily or quickly replaced.

Remedies: It is possible for war plants to reduce the number of vehicles required to carry employees to and from work through: Promotion of group riding among employees; Development of additional bus services wherever possible (a bus carrying 40 workers takes 15 private automobiles off the road, assuming a load factor of 3 persons per car); Cooperation in the development of a staggered hours program to relieve the time concentration of workers coming to plants in industrial areas so that more buses will be made available through repeated use at different starting times and; Estab-

lishment of "District Parking Lots" where drivers may leave their cars many miles from the plant and come the rest of the way by bus or trolley —or in fewer private cars through ride-sharing.

PROCEDURE

Survey: The first step in planning a smooth, safe, traffic flow system for access roads and parking lots is an analysis of existing physical conditions: roadways available, their widths, parking spaces available in areas adjacent to these streets, amount now being used, the parking arrangement in the lots used, etc.

Special maps and plans should be prepared. On one map should be recorded the location of the plant and the access road and street connections with the major routes of travel. On another map plot the traffic flow. If no traffic data is available, traffic counts should be made during the heavy travel periods of a typical day and plotted on a map. On another drawing, at a much larger scale, prepare a plan of the plant premises and the parking lots and access roads, extending as far as the nearest main street and highway connections. The drawing should include such information as:

1. Width, alignment, and number of traffic lanes of each roadway and driveway.
2. Boundaries and dimensions of all areas used for parking, showing the exact location of entrance and exit drives.
3. Arrangement of parking aisles, driveways and stalls, with dimensions and parking angle.
4. Gateways to the parking lot and whether used in one direction only, or serve as both entrance and exit.
5. Location and use of nearby buildings.
6. Routes followed by employees from the parking areas to the plant entrances.
7. Location of loading and unloading points for buses that bring employees to or near the plant gate and the paths of employees from these points to the plant entrances.
8. Type of surface for each parking area, roadway and bus terminal.
9. Unused areas adjacent to existing parking lots that might be available for expansion in case more space is needed.
10. Physical conditions such as railroad tracks, telegraph poles, fences, traffic control signals and other features which affect the flow of traffic and parking.
11. Direction of traffic flow on the access roadways to and from the plant and in and out of the parking lot. Include also the direction from which buses approach the plant and leave the plant.
12. Nature and manner of traffic accidents which have occurred in the problem area shown on the plan as collision diagrams.

Analysis: In analyzing the survey data the following objectives should be sought:

1. Provide for one way flow of traffic to and from the plant premises on access streets.
2. Eliminate parking from access streets wherever such roadways are insufficient in width to provide for two moving lanes in the direction of predominant flow. Where off-street space is provided for employee vehicles or where such space can be provided then parking on the access streets should be eliminated entirely. When vehicles are arriving or departing, a line of parked cars takes more than just the 7 foot lane occupied by stationary vehicles because an additional 10 to 12 feet of roadway is necessary for maneuvering in and out of the parking stall. Angle parking requires from 16 to 22 feet depending on the angle.

3. Provide signs and pavement markings to get vehicles into the proper lane well in advance of entrances. For example, if two or three gateways are to be used as entrances to parking areas along a given access street, the vehicles which are to turn into the first entrance should be directed into the right-hand lane as far back from the entrance as possible so that vehicles going on to the next entrance can have the next lane to the left for unobstructed movement.
4. Equip traffic control signals with program timers or manual control to adjust the "go" interval to fit the needs of the unbalanced flows that occur during shift change times.
5. Segregate buses, passenger cars and pedestrians. It is not always possible to segregate completely these three types of traffic, but their coincidental use of the same road space should be kept to an absolute minimum. Many plants have installed foot bridges or pedestrian tunnels to prevent foot and wheel conflict. Where substantial bus service is provided to the plant, separate bus terminals have been designed away from the passenger car parking lot.
6. Separate employee and plant traffic from general highway traffic through the use of alternate routes. These routes or streets are used either to take public traffic around an industrial area or to take industrial traffic around a concentrated business area.
7. Try to locate parking lots on the side of the plant toward which employees live, that is, between the plant and residential origin of drivers using the lot. This saves thousands of vehicle miles weekly and reduces vehicular crossing conflicts.
8. Minimize the backing required to enter or leave the stalls.
9. Arrange vehicles in double rows all heading in the same direction. The first vehicle in a double-length stall should enter in a forward direction facing toward the exit. If this vehicle leaves before the one which is parked behind it, then the latter car may also pull out in a forward direction without backing. Although it is possible to obtain a better alignment of vehicles by having them all park against barriers, this method requires every vehicle to back in order to leave the lot. It is felt that this disadvantage far outweighs the disadvantage of slight waviness in the lines of parked vehicles. The angle at which vehicles park will vary according to the the size and shape of the lot and type of surface provided. Where the surface is not finished in cement or asphaltic concrete or some other hard surface that will lend itself to pavement markings, it is difficult to use any parking angle other than 90° to the aisle. It has been found that where no guide markings are available each driver has a different idea of 45° or 60° as the case may be. However, where a hard surface is provided and where there is ample space to accommodate the parking load, the use of 45° or 60° parking stalls is preferred because of easier ingress and egress which saves time and accidents.
10. Provide, at least, one more exit than there are entrances to accommodate the sharper peak load thrown upon the exit facilities by employees leaving in a much shorter period of time than they arrive.
11. Park cars in separate sections of lot adjacent to their respective en-

trances and exits. If they are permitted to intermingle, a serious multiplication of crossing conflict occurs when they leave their stalls and seek divergent exits.

12. Provide broader aisles and stalls for buses with raised platforms between bus stalls so that passengers may have the protection of these platforms when waiting to board or when alighting. Parking stalls for buses should be at least 15′ wide; whereas they will vary from 8′ to 9′ for passenger cars, depending on the parking angle. The length of stall is determined by the length of the bus used whereas in the case of passenger cars a double length stall is usually 36′. Bus aisleways to the stalls should be a minimum of 50′ in width whereas passenger car aisleways may vary from 15′ to 25′ depending upon the angle of parking.

Execution: Complete cooperation among all agencies concerned, both private and public, is essential to a full realization of all the advantages of an employee transportation plan.

Condensed from a paper by Dwight M. McCracken, Director, Traffic and Safety Bureau, Liberty Mutual Insurance Company, Boston, Mass., presented at the 21st Annual Midwest Safety Conference, Chicago, Ill., May 1943.

STAGGERED HOURS

by HALLIE MYERS

WITHIN the last year or two there has been much discussion of staggering of hours as an aid to traffic and transit movement and rubber conservation. Many persons have been led to believe that this is a new technique. Staggering of hours has been used for many years for many purposes.

Industry has used this principle since the first time that two or more shifts operated in one factory. By it they are able to use the same factory space and the same machines for two or more workers instead of one.

Railroads have used this principle in apportioning the use of single track lines for trains.

Schools and colleges have used it so that one teacher may teach several groups of students.

Housewives in some apartment buildings have used it when one family used the laundry tubs on Monday, another on Tuesday and another on Wednesday.

Every well regulated household uses this principle every morning in apportioning time for each member of the family to use the single bathroom.

One broad definition of staggered hours might be as follows: "An allocation of time for the use of any limited thing or service so that more persons may conveniently participate in its use."

With this definition in mind, let us approach our so-called new problem of staggering hours for traffic and transit control.

For transportation purposes there are only two reasons for staggering hours: (1) To relieve congestion and delay to street traffic. (2) To afford a more efficient use of the limited number of mass transportation units.

Increased employment in areas served by mass transport and decreased use of private passenger cars, due to tire and gasoline rationing and adverse weather conditions have thrown unprecedented loads on transit lines. In some cities the increase in daily passenger volume is as much as 50% and much of this increase is confined to peak hours. It is not uncommon to find street cars and buses carrying many more persons standing than there are seated. Surveys in September in Gary showed street cars with a seating capacity of 44 carrying 120 passengers during the evening peak movement. Conditions in Indianapolis and

other cities are similar. Newspapers, public officials and private citizens complain that transit lines cannot carry the load. But they can carry the load if loads are properly distributed. A department store cannot care for all of its patrons in an hour each day. Neither can a doctor, lawyer, judge—nor can the home bathroom. But when the demand is properly distributed all can be served conveniently.

In considering staggered hours to aid mass transport we are faced with certain well-defined conditions.

1. There is a fixed number of vehicles available.

2. These vehicles have a maximum capacity.

3. It takes a certain amount of time for a unit to make a round trip.

These are conditions we can do very little about.

4. There are certain times of the day when available units are unable to meet the demand for service.

5. There are other times (including much of the day) when only about half the units are operating and then at only about half their capacity.

These are conditions which we can do something about. By careful planning and mutual cooperation we may all ride in comfort and safety, but to do so we must change our daily habits.

Any well considered plan for staggering hours in a city will be based on factual data which shows:

1. The present street traffic load and its distribution.

2. The present mass transit load and its distribution.

3. The number and capacity of available transit units.

4. The routes covered by these units.

5. The time required to make a trip.

6. The number of persons requiring service.

7. The place of residence and place of work of the persons to be served.

8. Their time of starting and quitting work.

With these facts established, it is merely a matter of adjusting the demand to the supply—bearing in mind certain other established facts, such as these:

(a) To be effective, the staggering must be wide enough to enable transit units to make more trips during peak hours. This is a matter of time required to make round trips.

(b) Peaks usually appear 15 to 30 minutes before the time of starting work and a similar time after quitting work.

(c) Care must be observed in changing established patterns that peak loads from separate industries or separate sections of a city do not converge at some point at the same time.

(d) Since the overall result desired is to maintain or increase war production schedules, sympathetic consideration must be given to valid objections raised by plant managers. We must not throw production out of balance merely to preserve our own ideas of an ideal staggered hours plan. Often changes suggested by plant managers will improve the original plans or minor adjustments may be made which will relieve them of tremendous difficulties.

Persons considering staggered hours plans are always faced with these four questions: Why stagger hours? When to stagger hours? Where to stagger hours? How to stagger hours? The answers are:

Why? In order to secure a more efficient use of existing mass transportation units.

When? Whenever the demand for service has reached such proportions that during certain peak periods transit units are unable to care for their patrons, conveniently, safely and comfortably.

Where? In factories, stores, offices and schools in proportion to the amount of congestion caused by their existing schedules.

How? By the use of factual sur-

veys broad enough to establish existing conditions and by carefully weighing these facts one against the other until a balanced program results in which is caused the greatest convenience and the least disturbance of habit to the greatest number of persons whose travel is essential.

No such plan should ever be considered final. Times and conditions change and programs must be correspondingly adjusted. Some of our cities are now suffering from lack of staggering of hours while their transportation authorities complacently point to the fact that they have a staggered hours program. They have completely missed the point that no plan is effective unless it is kept adjusted to changed conditions. New industries must be fitted into it; transit units wear out or are destroyed, and other conditions change. The answer tomorrow is not the same as today. You cannot say "This is it" and stop there.

Condensed from a paper presented by Hallie Myers, Director of Traffic, State Highway Commission of Indiana, at the 29th Annual Purdue Road School, Lafayette, Indiana, Jan. 1943.

THE CONTROL OF TRAFFIC SIGNS IN PENNSYLVANIA

by RAY F. RIEGELMEIER

THE Commonwealth of Pennsylvania has a very unique and powerful control over the sale of traffic signs.

In 1937, the General Assembly enacted legislation which vested authority in the Secretary of Highways to regulate the sale and use of traffic signals, traffic signs and other traffic devices. The primary purpose of the legislation was to obtain a standardization of all traffic devices throughout the state.

The Secretary of Highways is required to follow the standards established by the National Conference on Street and Highway Safety, insofar as practicable, and to publish a Manual of Regulations to serve as the absolute guide for the sale and use of all traffic devices. The original Manual was printed in 1938, and a revised issue will be available in a few months.

The procedure for establishing the standardization of traffic signs is relatively simple. The Department of Highways controls the manufacturer of traffic signs rather than the municipalities which purchase them and in this manner, it is only necessary to deal with a mere handful of manufacturers and their agents; whereas, over 1,000 political subdivisions would require supervision if control over the purchase were required.

Each manufacturer is required to deposit $50 with the Department of Highways which is to cover the cost of testing signs. A full size sample of each type of sign to be sold must be submitted to the Traffic Engineer to determine whether or not it complies with the standard. All signs complying with the requirements are approved and a permit is issued to the manufacturer for each type of sign approved.

The cost of testing a plain sign is usually $1, and the cost of testing a reflector type sign is approximately $1.25. As signs are tested and approved, deductions are made from the manufacturer's initial deposit of $50 until this amount has been entirely utilized, after which it is necessary for him to make a second $50 deposit.

Traffic signs are tested for their conformity with the size, color, shape and message of the standard Highway signs. The type of material of which the sign is made, the type of reflector buttons, the gloss of the paint, etc., are optional.

Each sign sold by any manufacturer must have the permit number stamped on the rear surface of the sign. This

provides an identification while the signs are new but is lost after the signs are repainted by the municipality. The District Traffic Engineers are constantly alert for the erection of new signs, however, and check any new installations to determine whether or not the signs are official. Signs purchased by the Department of Highways for its own use have a small Keystone embossed on each sign as a means of identification.

The law is very specific in its explanation of the procedure to be followed and it provides a substantial penalty clause to aid in its enforcement. This clause has been instrumental in providing full compliance with the regulations but, fortunately, it has not yet been necessary during the past five years to resort to the use of any penalty measures. The Act establishing this procedure is as follows:

"(a) It shall be unlawful for any person to use on any street or highway in this Commonwealth any traffic regulatory sign, signal, marking, or any other device, unless of a type which has been submitted to the Secretary of Highways for test, and for which a certificate of approval has been issued by the Secretary of Highways, and is then in effect as provided by this Act.

"(b) Any person desiring approval of any traffic sign, signal or any other traffic regulatory device shall, when required, submit to the Secretary of Highways, one or more sets of each type of device upon which approval is desired, together with the fee provided in this act. The Secretary of Highways shall, upon notice to the applicant, submit such device to the United States Bureau of Standards, or to such other recognized testing laboratory as he may elect, for a report as to the compliance of such device with the rules and uniform standard specifications adopted by the Secretary of Highways. Such devices will also be subject to any road tests or other tests as the Secretary of Highways may deem necessary to determine that each type of device, they and their component parts, conform to the requirements as adopted by the Secretary of Highways. The Secretary of Highways is authorized to refuse approval of any device certified as complying with the specifications and requirements, which the Secretary of Highways determines will be, in actual use, unsafe or impracticable, or would fail to comply with the provisions of this act, or such requirements as may be adopted by the Secretary of Highways.

"(c) The Secretary of Highways shall request the testing agency to submit a report of each type of device to the Secretary of Highways in duplicate. For those which are found to comply with the specifications, and requirements, the report shall include any special adjustments required. Reports of all tests shall be accessible to the public, and a copy thereof shall be furnished by the Secretary of Highways to the applicant for the test.

"(d) It shall be unlawful for any manufacturer, jobber, retailer, or their agent, or for any other person, to sell, lease, or offer for sale or hire, any sign, signal or any other traffic regulatory device that does not conform to the provisions of this act.

"Penalty—Any person violating any of the provisions of this section shall, upon summary conviction before a magistrate be sentenced to pay a fine of not less than one hundred ($100) dollars or more than one thousand ($1000) dollars and costs of prosecution, and, in default of the payment thereof, shall undergo imprisonment of not more than thirty (30) days."

1. A system of priority routes for war traffic should be designated wherever possible, and these streets and highways should be given preferred traffic-control treatment at all times.

2. Remove and relocate unnecessary signals. Many streets where traffic lights were once needed may now be little used, or may have heavy traffic only at certain hours. At these times use traffic police on these streets, and relocate the signals at intersections of streets which now are carrying the new traffic of war industry.

3. Reco-ordinate and shorten signal cycles for progressive operation: about 35 to 50 seconds is the correct time lapse. Longer cycles should be used only at unusually complicated intersections, or to expedite heavy bus or truck traffic. Co-ordinated signals within one-quarter mile of one another will eliminate the backing-up and jamming of traffic, and will reduce the number of stops to save tires and gasoline.

4. Replan the use of flashing amber signals according to the following basic periods. This will help to expedite traffic on streets lightly traveled except for peak loads at shift hours. With variations, these periods can be fitted to the needs of any individual-area problem:

DAY

7 a.m. to 9 a.m.—use full signal
9 a.m. to 11 a.m.—use flashing amber
11 a.m. to 1 p.m.—use full signal
1 p.m. to 3 p.m.—use flashing amber
3 p.m. to 7 p.m.—use full signal

NIGHT

7 p.m. to 11 p.m.—use flashing amber
11 p.m. to 1 a.m.—use full signal
1 a.m. to 7 a.m.—use flashing amber

If you need to purchase new equipment, and want to be sure of immediate attention for your priority application, be sure to send the following information to WPB with the correct application form:

1. A record of the traffic count during peak hours at the intersection(s) under consideration
2. A record of any accidents or fatalities which have occurred recently at the intersection
3. A rough map showing the relation of this intersection to war industries or military camps
4. Any other pertinent data which will justify the necessity of the installations, as WPB must have a clear picture of your problems and needs

For further information and help with your traffic program, call on our nearest office, or write General Electric Company, Schenectady, N. Y.

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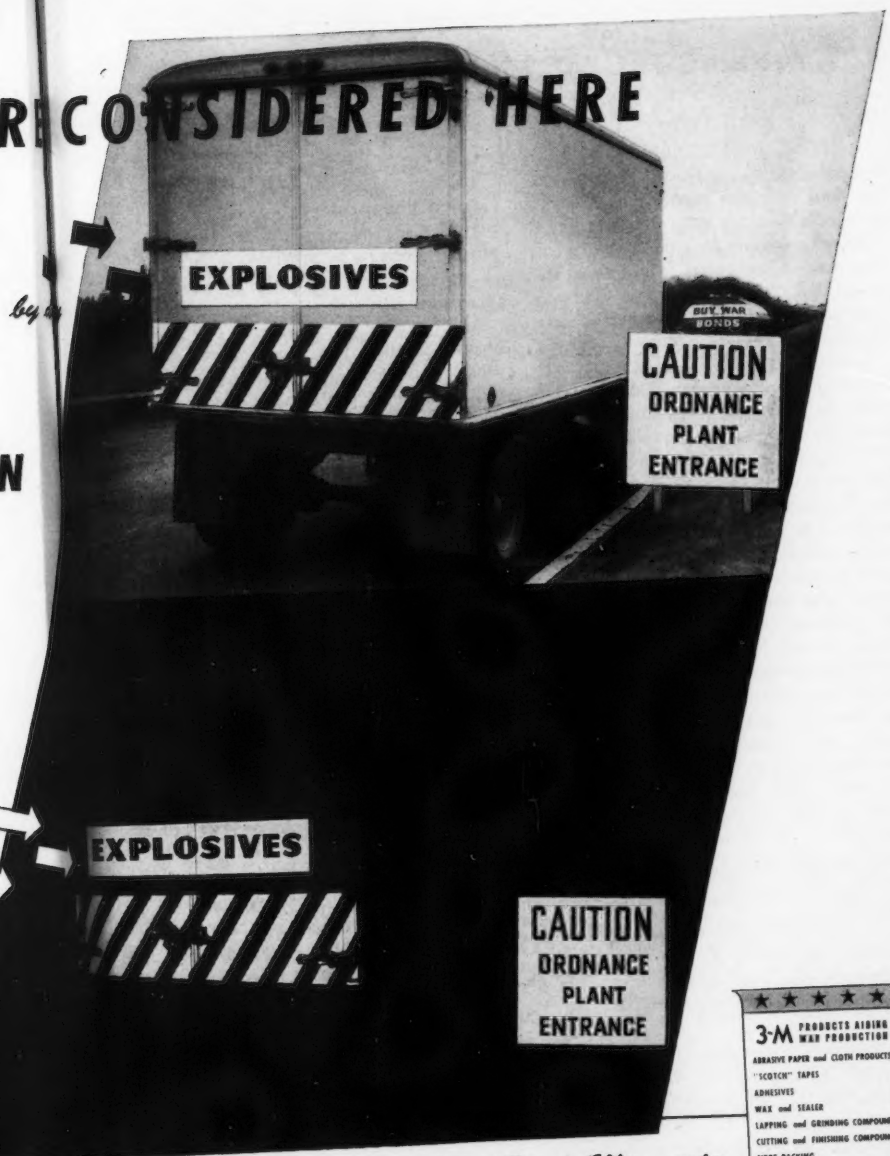

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WINNING THE BATTLE OF TRANSPORTATION

by FRED W. FISCH

"YOU CAN'T DEPEND ON AUTOMOBILES!" Mark that in big red letters and post it on your office wall. Despite the release of automobile rubber for essential driving, it is safer to assume that the government may find it necessary to change this policy, and therefore it would seem wise to be prepared for such a contingency.

Schenectady officials discussed the impending transportation problem with the General Electric Company, the largest single employer in Schenectady. Accurate information of the origin, destination, and mode of transport for all General Electric employees was sought. The company published a map and a simple but complete questionnaire in the employees' newspaper. A survey was made of all cars parked in the parking lots of the company, which served as a double check on the questionnaire and enabled us to count the number of passengers carried by each automobile. Early last spring, the average number of passengers coming from outside the city was 2.1, and from inside the city, 1.5; these averages are now 2.6 and 1.7, respectively. We found that continual checking and rechecking was necessary because none of the factors remain constant.

We also learned that questionnaires cannot be elaborate or complicated—if they are, the issue may become confused and the ultimate purpose defeated.

All information was tabulated and classified to determine the potential load factor for each bus and trolley line, for each of the transportation companies, both inside and outside the city.

About 1/3 of the General Electric employees walk to work, 1/3 use public transportation facilities, and the remaining 1/3 ride in private vehicles. To obtain the city-wide picture, the General Electric figures were increased by 40 per cent to allow for the employees working in other industries and to provide for contemplated increases in employment.

Since we were basing our estimates on the possibility of no private automobiles, it was apparent that 2/3 of the workers in the entire Schenectady area ultimately would have to be transported on public vehicles, while the remaining 1/3 continued to walk to work. This meant that the load on public transit vehicles would eventually be doubled and that the potential peak would require a 100 per cent increase in the number of public vehicles.

Therefore this was our problem:

1. To make one vehicle do the work of two.
2. To conserve private cars for passenger-carrying use so that the transition from private car to public vehicles would be gradual.
3. To preserve the use of private cars for as long a period as possible.

During January, February, and March 1942, few persons outside the government realized how serious a situation was developing.

Mr. Joseph B. Eastman, the newly appointed Director of the Office of Defense Transportation issued a program for the conservation of vital public and private transportation. In New York the State War Transportation Committee was set up as the cooperating agency and in Schenectady we have been operating under this New York State plan since May 1942.

Fortunately, much of the groundwork had already been completed, and when the data were placed before the different public-transit companies, it was possible to move ahead rapidly coordinating a plan for the adjustment of schedules, establishment of express runs, skip stops, and related changes with the entire area in mind—not just one transit line.

The application of these measures, together with the re-establishment of rail service in Schenectady (it was in the process of being abandoned) indicated the estimated number of additional vehicles required could be reduced from 100 per cent to 50 per cent. But this reduction was not enough. It was still imposible to obtain any new equipment.

Everyone benefited on September 28 when working hours were staggered for all industrial and business firms, and for the schools.

At the General Electric works the morning peak was staggered so that public transit vehicles could make two or three round trips between 7 A.M. and 8:30 A.M.—instead of one trip to carry everyone whose hours began at 7:30 or 8 A.M. Thus, the average load per vehicle has been materially reduced. The total number of people carried is the same, or even greater, but they are now carried in two or more "shifts" per vehicle, instead of all trying to crowd into a vehicle at the same time.

The individual has a better chance of getting a seat. More important is the increased capacity which is now available for those workers who will eventually be compelled to transfer from private automobiles to public vehicles. This increase in total capacity is estimated to be from 30 to 50 per cent.

This is only the first phase of the battle of transportation in Schenectady. There remains much to be done. Group riding must be promoted. The average capacity of each car is about 5 persons, average occupancy 2.1 persons per car. Vehicles carrying workers from the commuting area have an average occupancy from 2.7 to 3.0, varying with origin points and work-hour shifts. Simple arithmetic shows that these people can be carried with ½ to 2/3 of the cars now being used.

The following ten points summarize our strategy in this fight for adequate continuing local transportation:

1. Define the problem by the sampling method.
2. Use simple but complete questionnaires.
3. Map the origin and destination of all workers.
4. Determine the percentage of passengers using each mode of transport at different hours of the day.
5. Assume that public vehicles must carry the entire load.
6. Determine the increased load which will be thrown upon each line of each transportation system in the area served.
7. In effect, pool all common-carrier facilities.
8. By applying the ODT and State Conservation programs—particularly staggered hours—endeavor to accommodate the potential increased load with the minimum of additional vehicles.
9. Institute an aggressive publicity and promotional campaign (a) to emphasize the limited supply of vital transportation; (b) to make motorists think twice before going anywhere, and (c) to increase the number of workers carried in each private car.
10. It is essential to check and recheck continually the conditions affecting transportation.

Condensed from an original article appearing in The American City, issue of December 1942 by Fred W. Fisch (Mem. I.T.E.), Director, Bureau of Traffic City Planning, Schenectady, N. Y.

TRAFFIC ACTUATED SIGNAL SYSTEM IN SAN DIEGO SOLVES CONGESTION HAZARDS

by R. B. LUCKENBACH

A RECENTLY completed contract between Market and Couts Streets on the Pacific Highway in the City of San Diego, concludes a series of projects under direction of the State Division of Highways, which render a greatly improved traffic service.

This road is a portion of the State Highway system—U. S. 101—and is the principal entrance to the city. In addition to heavy trucking and through travel, it also carries a very heavy volume of local traffic.

Starting in the fall of 1940, the expansion of war industries and military activity, resulted in serious congestion by increasing the volume and introducing heavy pedestrian movements, with constant turning, stopping and intersection conflicts resulting from proximity of large parking areas, in addition to curb parking.

The four-lane highway proved inadequate under the conditions and loads, and delays of 10 minutes to the mile were not uncommon, with resulting accumulated masses of vehicles extending the congestion to all adjacent areas when they were released.

A series of improvements were planned, with uniform traffic movement as a goal, combined with a minimum of delay and increased safety for pedestrians and cross traffic.

The highway was widened to six lanes, with a parking lane on each side and a six-foot-wide curbed center division, with openings generally restricted to the major city street crossings. Pedestrian overpasses were constructed at three locations of heaviest concentration, and vehicular separations built at three locations where the most serious vehicular conflicts occurred.

The recently completed contract included the most modern type of traffic control equipment at seven consecutive intersections. The system is fully traffic actuated without interconnection using the latest type of self-coordinating full traffic actuated controllers. These automatically adjust themselves to the instantaneous variations in traffic volume, relative densities of traffic on the two phases and the total elapsed time between actuation and the assignment of the right-of-way.

Prior to reconstruction, there were fixed time controllers at Broadway, Cedar and Sassafras Streets, the latter two being operated only on demand, by a pedestrian push button, or a contactor in the street. Overtaking collisions were prevalent at these intersections, and one or more property damage accidents occurred nearly every day.

Likewise, vehicles frequently ran the red lights, seriously endangering the pedestrians and requiring constant police patrol. Police direction was required during peak periods at several locations. Crossing was very hazardous, both for pedestrians and vehicles, particularly for single pedestrians. Speeds averaged 25 to 35 miles per hour.

In addition to the six-foot, curbed center island for the entire length of the project, small tapered islands were included at each approach to the signalized intersections. Regular three-light traffic signals were placed on eight-foot standards, with a raised base on each center island for vehicular indications.

Two-light "Wait-Walk" signals on six-foot standards were used for pedestrian indications. Pedestrian push buttons were placed on each "Wait-Walk" standard, and on the center standards in the wide highway.

Traffic counts taken during two days in February, 1943, show 15 minute volumes entering the Laurel Street intersections during the peak hours:

P.M.	Thursday		Friday	
3:00-3:15	469		484	
3:15-3:30	591		385	
3:30-3:45	657		663	
3:45-4:00	852		570	
4:00-4:15	492		664	
4:15-4:30	635		770	
4:30-4:45	548		485	
4:45-5:00	599	2,636	556	2,767

Observed operation of the signals show a wide variation in timing as the traffic pattern changes. A typical timing in seconds of consecutive green indication during the peak volumes, is as follows:

A Phase	B Phase	A Phase	B Phase	A Phase	B Phase
31	18	32	18	26	19
30	24	57	22	25	20
34	24	47	19	17	16
35	23	40	17	30	22
33	13	32	15	27	14
63	22	39	19	35	19
46	20	25	12	38	23
26	17	35	14	36	21
32	27	37	25	37	20
37	23	40	15	34	25
36	20	30	14	34	26
40	22	59	11	32	29
40	24	30	15	50	23
51	23	36	20	31	24
33	23	31	19	33	24
32	20	55	16	24	18
47	22	30	18		

Separate pedestrian interval timers were used on each phase. These timers consist of a small synchronous motor and necessary relays to operate the "Wait-Walk" light. The pedestrian indication rests in the "Wait" position until a call is received from a pedestrian push button, and does not change from vehicular actuations. The pedestrian call also registers a single vehicle actuation, so that at the next change in phase, the "Walk" light comes on with the vehicle green. "Walk" periods of 11 to 15 seconds were used with a protection period of 4 to 7 seconds, plus the amber time, which varies from 2½ to 3½ seconds.

The synchronous motors have various cycles and will repeat after a full cycle, providing no call has been registered in the opposite phase. The minimum green without pedestrian actuation is 6 to 10 seconds.

A pressure sensitive vehicle detector was placed in such a position that the left turn vehicles would cross it and hold the signal to permit several such turns. Due to the elimination of many center curb openings, "U" turns are permitted at these intersections. The left turn movement is made by crossing a normal west-bound left turn, but no trouble has been observed from this minor conflict.

During peak periods, when the interval is held by the pedestrian movement, this device operates very effectively and safely, as the left turn can be made without conflict with either the major flow of vehicles or pedestrians.

The installation may be said to be thoroughly satisfactory in that it accomplished the desired results. Vehicular movement is remarkably uniform and smooth. Delays are short and infrequent, and the entire system can often be traversed without stopping.

The pedestrians are observed to walk much faster, group better, and stragglers are greatly reduced, so that traffic is seldom held up at the end of the red period, due to pedestrian interference. The few stragglers or persons desiring to walk abnormally slow, can take refuge on the center island, with safety, where they will not hold up vehicular movement. The signals are equipped with blackout shields and operate 24 hours a day.

"California Highways and Public Works"—March-April 1943, by R. B. Luckenbach, District Traffic Engineer.

DIMOUT CRASHES INCREASING

Night traffic accidents in the dimmed-out cities of Bridgeport and New Haven have risen 21 per cent since the war measure was adopted, although daytime accidents declined almost as much in the same period. Both figures are based on a study of the accident statistics of the two cities in relation to the amount of driving done between June 1, 1941, and December 1, 1941, and comparing this total to the same period for 1942. Pedestrian injuries were half again as high in the six months following the Army dimout order as they had been for the same period prior to the reduction of street lighting by about 50 per cent. These facts were revealed recently by Richard E. Simpson, dimout official of the Connecticut State Defense Council.

UNIFORM DEFINITIONS OF MOTOR VEHICLE ACCIDENTS

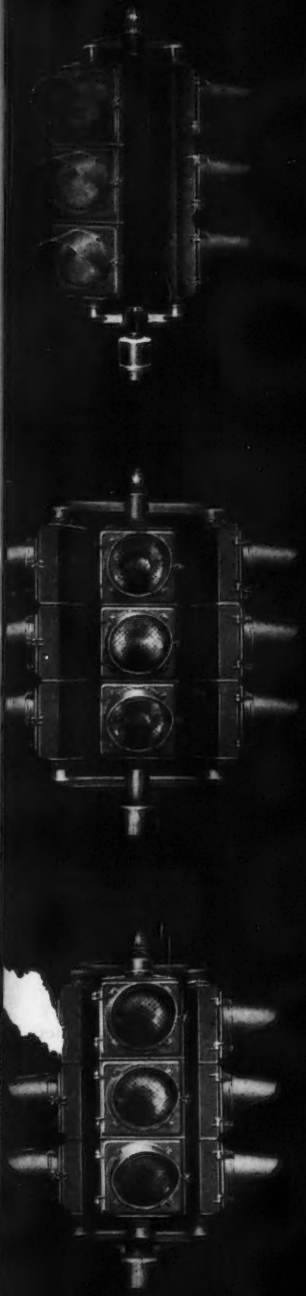
A new manual on "Uniform Definitions of Motor Vehicle Accidents" has just been issued by the U. S. Bureau of the Census in cooperation with the National Conference on Uniform Traffic Accident Statistics.

Because of differences in the use and interpretation of definitions by various agencies, it has been exceedingly difficult to secure comparable figures on motor-vehicle accidents. The adoption of this manual by those engaged in the collection, tabulation, and publication of statistical data relating to motor-vehicle accidents will constitute a big step toward the achievement of uniformity and comparability of published statistics. The manual contains a detailed classification of all the types of motor-vehicle accidents with examples.

The Uniform Definitions of Motor Vehicle Accidents was adopted by the National Conference on Uniform Traffic Accident Statistics on March 4, 1942, and recommended for use in classifying motor-vehicle accidents, starting in 1943.

The following organizations have approved and endorsed the Uniform Definitions of Motor Vehicle accidents: American Health Association; American Trucking Association; Conference of State and Provincial Health Authorities of North America; U. S. Bureau of Motor Carriers; Interstate Commerce Commission; Division of Statistical Standards, U. S. Bureau of the Budget; International Association of Chiefs of Police; National Association of Coroners; National Safety Council; Society of Automotive Engineers; U. S. Bureau of the Census; U. S. Bureau of Labor Statistics; U. S. Public Roads Administration; and the U. S. Public Health Service.

Copies may be obtained free from Director J. C. Capt, Bureau of the Census, Washington, D. C.



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Harold W. Moore, 2114 Sherman Ave., Evanston, Ill.

Chairman V. A. Rittgers reports that procedure in handling applications is slow this year due to the delay in replies from references and applicants.

OHIO TRAFFIC SESSIONS

The National Institute for Wartime Traffic Training being held at Ohio State University, Columbus, Ohio, from June 21 to July 2 will devote its entire sessions to war traffic problems with emphasis upon the problems of training replacement drivers, especially women who are replacing men in war industry.

Director T. M. Matson and the staff of the Yale Traffic Bureau will conduct short training courses for traffic personnel. These courses will emphasize the techniques and procedures or "*Know How*" of solving not only "Zone of the Interior" traffic problems but also treat of traffic congestion and accident difficulties confronting the transportation official in the days ahead when tires, gasoline and vehicles again become plentiful.

ON THE SHELF

1942 Proceedings at the Institute of Traffic Engineers including technical papers and activities by Institute of Traffic Engineers, 60 John Street, New York, N. Y. 66 pages. $1.00.

Proceedings Regional Wartime Conference on Employee Transportation published by the National Conservation Bureau, 60 John St., New York, N. Y. This publication contains up-to-date information on Group Riding, Staggered Hours, Preventive Maintenance, Transportation vs. Housing, Parking and Bus Terminals, Transportation Surveys, etc.—86 pages—Price $1.00.

Victory Highway by the Automotive Safety Foundation, Washington, D. C., a thirty-five minute sound film depicting the Wartime Highway Traffic Program.

Point Control of Traffic by the Safety Division, International Association of Chiefs of Police, 1827 Orrington Avenue, Evanston, Ill. This booklet outlines the techniques which police officers can use effectively to ease traffic congestion at and between intersections.

Getting Results—a booklet containing 24 examples of traffic solutions applied by traffic engineers throughout the United States: published by the National Conservation Bureau, 60 John Street, New York, N. Y.

Counterattack by Myron M. Stearns, published by the Automotive Safety Foundation, Washington — outlines graphically and informatively motorized America geared to war.

Training Safety Leaders—a Report to the Planning Panel on War Safety Training, published by U. S. Dept. of Labor, Division of Labor Standards—indicates in detail the need for safety training, the program developed to meet this need, the accomplishments already achieved under this program, and the job that lies ahead.

EXCERPTS FROM O.D.T. NEWS RELEASES

The two best expedients for the relief of the local transportation situation still are: (1) group-riding and (2) staggered hours.

The staggering of opening and closing hours for industries and other establishments becomes increasingly important when we realize that it is estimated that by the end of 1943 about four times as many people will be going to work every day as can be carried at any one time in all available public vehicles. Staggered hour programs have already been adopted in about 300 cities. In New Jersey, under a state-wide plan, about 175 public and parochial high schools have had their hours set ahead. In the City of Newark all retail businesses in an area of about three miles have been ordered "not to open their doors to the public between 8:00 and 10:00 A.M. and not to close between 4:00 and 6:00 P.M." In San Francisco most retail stores open at 10:00 A.M.

In Pennsylvania taxicabs provide "share-the-ride" services. Taxicab operators are required, provided that the first party engaging the taxi consents, to accept other passengers for transportation to destinations in the same general direction. The passenger first alighting must pay the regular fare for the trip to that point. The second passenger alighting must pay the regular fare from that point to his point of destination, etc.

* * *

The mileage limitations have been removed under which new buses have been operating. City buses placed in service after July 31, 1942 had been restricted to 3,000 miles per month. The lifting of the limitations, effective May 1, 1943, was due primarily to the fact that older buses, having been kept in service beyond the time of normal retirement, are rapidly becoming less available for steady use, owing mainly to the lack of the obsolete repair parts they require. This order affects about 2,787 buses which may still be reassigned from their present service to any place in the country where a greater need exists.

* * *

Due to the rubber and gasoline shortages, the rapid obsolescence of vehicles that run on rubber, the lack of new equipment, and widespread difficulty in getting parts, local transportation systems, especially in communities with war plants are being heavily overtaxed. No system of priorities with respect to the use of local transportation facilities is contemplated and avoidance of this step is urgently desired.

Lack of adequate transportation facilities has been revealed as a factor in absenteeism among war workers. Surveys have shown that in areas where transit facilities are good, workers are away from their jobs much less frequently than in sections where transportation is less satisfactory.

The transportation situation makes it imperative to start vacation schedules early and extend them throughout the year in such a way as to avoid travel during holiday periods and weekends. Whenever possible vacation travel should begin and end on Tuesdays, Wednesdays or Thursdays. The railroads and buses could not handle the vacation travel this year if it were concentrated in July and August.

POLICE TRAFFIC TRAINING

Northwestern University Traffic Institute will open its fall four-month Fellowship Course on September 13th with a class of 29 police officers. With the ending of the four-month course on June 16, 1943, one hundred and thirty-one men will have received fellowships provided by the Kemper Foundation for Traffic Police Training and the Automotive Safety Foundation.

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